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STATISTICS AT THE FOURTEENTH INTERNATIONAL CONGRESS ON HYGIENE AND DEMOGRAPHY, BERLIN, SEPTEMBER 23-29, 1907.

SUMMARY OF THE MAIN ADDRESSES AND DISCUSSIONS BEFORE
THE DIVISION OF DEMOGRAPHY.

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[A summary of the papers and discussions will interest American statisticians both because of their intrinsic importance and because of the insight they give into the condition of demography in the German Empire and to a less extent in the other countries of Europe. In view of the meeting of the same Congress at Washington September 23-28 of this year, the summary is timely as affording a means of informing the members of this Association who plan to attend that Congress, and we hope there are many such, about the last one.]

The *first* topic was *life tables*. Papers were presented on life tables for the German Empire by Rahts, for Prussia by Ballod, and for Berlin by Boeckh.

For the *German Empire* as a whole the only life table which had then been made was that for the decade 1871-80. It was prepared by Becker on the method he laid before the International Statistical Congress at Budapest (1876). This method follows every person who begins a given year of life in a certain calendar year through that year of life so as to compare the number who die during it with the number who enter upon it. The deaths to be considered are distributed through two calendar years and, if the living population for ten years is covered, the deaths for eleven years must be examined but with the exclusion of about one half of the deaths occurring in the first and last of the eleven years. For seven German states and a little over three per cent. of the population the requisite information was lacking.

Recently the Imperial Statistical Office has undertaken the preparation of similar tables for 1881-1890 and 1891-1900.

The available material is far better than that Becker had. In his day Oldenburg was the only German state reporting deaths by years of birth and years of age. For the later decades 14 of the 26 German states give this information. The number of states not giving the minimum information needed has diminished and only one per cent. of the population has now to be excluded. The method of Becker is used but with some improvements. The deaths of only ten calendar years are considered. Deaths are tabulated only by years of age, the return of year of birth being used merely to measure the influence of migration. This is important because some German states tabulate deaths only by years of age.

For each of these two decades 1881-1890 and 1891-1900 a German life table for each sex is to be computed. Other tables will be prepared for each state or group of adjoining states. Alternative methods also will be tried in order to see how the results reached by different methods agree.

Recent life tables for *Prussia* compared with those for 1859-1864, 1868-77, and 1890-91 show a notable increase in the average duration of life. This increase of vitality is most marked at ages 1-19, less marked at ages 20-54, and least noticeable at ages above 55. Separate life tables for urban and rural population reveal the greater vitality of the country folk, a difference which is marked only among males. At the ages 40-49 the advantage lies apparently with the city folk. If the case of Berlin is typical, the city-born population has the shortest duration of life. Here too male immigrants to the city show a greater advantage over the city-born than female immigrants do.

Life tables for *great cities* were treated by Boeckh, then 83 years old, in a report which he was unable to present in person. He concluded that life tables for males and females should be made for each year and that the need for them is greatest in large cities in which the population changes rapidly. The registration of all arrivals and departures from a city makes it possible to determine the population at the beginning and end of the year. All such migrants should be classified by year of birth and thus the resident population of

the city classified by year of birth determined for comparison with the decedents similarly classified.

To Boeckh's report Rahts added: No other large city except Charlottenburg has life tables comparable in accuracy with those of Berlin. In all large cities where immigrants and emigrants are accurately registered life tables should be made for each year.

In the discussion Lexis urged that all census or registration age returns should be made both by year of birth and by year of age. Seibt proposed to embody the suggestion in a resolution. Kiaer pointed out that the mortality of married men was much lower than that of unmarried men. At the age of 20-29 they were related as 2 to 3. The influence of this difference on the death rate of both classes together is marked. Wagner suggested that the mortality of groups classified by property or income was more significant than the mortality of occupational groups. The former, he thought, might be determined in Germany. Von Bortkiewicz said that the differences in average duration of life between the Prussian provinces were much less than those between the English counties. Manchester, e.g., has almost as short an average duration of life as British India. He doubted the value, scientific or practical, of annual life tables like those of Berlin.

The *second* topic was "the duration of life." A paper by Levasseur and Huber was presented in the authors' absence by March. It urged that the comparison usually made in those countries or cities for which life tables have been constructed between the average duration of life from birth should be supplemented by comparisons between the average after-lifetime at various ages. A low expectation of life at one period of life, like infancy, may coexist with a moderate or high expectation of life at other periods. A paper by Silbergleit emphasized the marked increase in the average duration of life in Berlin during the last quarter of the nineteenth century as shown by the life tables prepared each year for that city. The expectation of life at birth increased from 29 years in 1876 to 38 years in 1900; that at age 1 from 42 to 50 years; that at age 2, when it reaches its maximum, from 46 to 52 years; and each later age shows some increase in the

duration of human life. Among the causes suggested for this increase were the system of compulsory insurance, the better economic condition of the population, and the sanitary improvements which had been introduced.

In the discussion of these papers Kiaer pointed out that the underlying assumption of a constant mortality was very questionable and Hamburger that the increased duration of life in Berlin was largely due to the decreased birth rate. Von Mayr urged that historical changes in mortality should be sharply distinguished from a statement of present conditions, the latter alone being of great practical importance. Wagner thought that the great increase in length of life at Berlin was largely due to the favorable economic conditions after 1895. Von Bortkiewicz urged that death rates at the several ages were not independent variables. A low death rate at 40, for example, might of itself explain a death rate twenty years later at 60 higher than the present death rate at that age. Mayet challenged the common opinion that the decrease of total mortality is mainly due to the decrease of infant mortality. He had found that the annual death rates of infants and of the rest of the population of Berlin had varied from year to year between 1816 and 1905 in much the same way and that the decrease of mortality among children over 5 years of age had been greater than that among infants, conclusions from which Ballod and von Juraschek dissented.

The *third* topic before the section was infant mortality. It was treated under three divisions: (a) Methods; (b) Influence of food; (c) Breast feeding.

Under *methods* Prausnitz urged that comparisons between different regions in which the intervals allowed for registering a birth differed were unsafe. If that interval is long, many births of children dying before registration are likely to be registered as still-births. The difficulties in getting an accurate record of the causes of infant deaths are much more serious. To diminish them he had organized at Graz special investigations made by a physician experienced in children's diseases into all cases of infant deaths. His experience led him to believe that under exceptional conditions this was practicable. There must be a children's physician at command and he

must get news promptly of each death. Where practicable this method gives a much better basis for the study of infant mortality. His results indicated, e.g., that tuberculosis is a more common cause of infant deaths than is commonly supposed, many cases really tuberculous being returned as due to dyspepsia, atrophy, or bronchitis.

Silbergleit called attention to the difficulty of measuring infant mortality where many children were sent out of the family and perhaps out of the city to nurse, and also to the error involved in comparing the annual deaths under 1 with the births of the same year when about 30 per cent. of these deaths are of children born the year before. He also mentioned an improved method of studying monthly variations of infant mortality.

The *influence of food* upon infant mortality was examined in one address by Foth upon the supervision of the supply and distribution of milk and another by Biedert on the results of recent measures for the protection of infants, especially in France. The latter showed that the decrease was greatest in the rural districts of France and least in Paris and that apparently the decrease of infant mortality did not run parallel with the decrease of the birth rate. He laid much stress upon the influence of summer temperature and favored special local studies like those begun by Prausnitz.

Neumann had studied infant mortality in Berlin classifying the families into those occupying two rooms and a kitchen, three rooms and a kitchen, and four rooms or more, 89.5 per cent. of the births occurring among the first class, 6.0 per cent. among the second, and 4.5 per cent. among the third. The mortality of nursing children in all three classes was very low and in the poorest class less than double what it was in the highest. The mortality of bottle-fed infants was from 4 to 7 times that of breast-fed infants in the same class. His main conclusions were that the danger of artificial food became greater in proportion as the economic position was poorer, the infant younger, and the heat greater, and that the most effective means of reducing infant mortality was to increase the proportion of breast-fed children.

Landsberg presented a paper which examined carefully and skilfully the various methods of measuring the effect of food upon infant mortality. Many cities of Germany and Austria now require on an infant's death certificate a statement of the kind of food administered either shortly before its death or throughout its life. But even in Berlin on about one sixth of the certificates the question is not answered. The resulting proportions of deaths among infants fed in various ways are of little help because they are controlled largely by the variable prevalence of breast-feeding in the population. The number of breast-fed and bottle-fed children among infants living as well as those dying is indispensable. This information has been sought: (a) from the person attending the birth and for the following six weeks (Saxony); (b) from the statistics of maternity hospitals (Amsterdam); (c) from the statistics of compulsory vaccination of infants (Bavaria); (d) from the census statistics of a city (Berlin, Hanover).

Freeman presented a paper dealing mainly with the control of the milk supply in New York as a factor in the reduction of infant mortality.

Under the third sub-topic, Lange urged the importance of ascertaining the prevalence and duration of breast-feeding in various countries and their subdivisions and claimed that the method followed in Berlin and Barmen was unsatisfactory. He favored recourse to the records of midwives. Ziegenspeck considered the reasons that so small a proportion of children are breast-fed, arguing that the mode of dress tended to check the normal development of the breasts and that inability to nurse a child was inherited. On the latter point he cited von Bunge's results showing that only two daughters out of 486 born to mothers who could not nurse their children were themselves able to nurse. Among the results of bottle-feeding as stated by Röse, he mentioned defective teeth, rickets, slow growth, and more frequent incapacity for military service. Thus among 763 bottle-fed children who had reached the age for military service less than one third were able to pass the physical examination of recruits, while of 1,123 who had been breast-fed throughout the first year of life nearly one half passed the physical examination and between these

two extremes the longer breast-feeding had continued, the larger the proportion of the recruits who were up to the standard.

In the discussion on infant mortality, Neumann said that in Denmark all cows supplying children with milk were supervised by veterinarians. Tuberculous cattle were killed and the owner reimbursed by the state. A sick cow was separated from the herd and its milk no longer used. A city ordinance regulated the fatty contents of the milk, ordinary milk to have not less than $2\frac{3}{4}$ per cent. fat, skimmed milk not less than $\frac{3}{4}$ per cent., milk for children not less than 3 per cent.

Dr. Agnes Bluhm admitted that, if the duration of nursing by the mother could be reported by the midwife as Lange urged, it would be most satisfactory. But this she thought impracticable; the midwives would not do it without pay and the mothers would not like them to do it. The capacity to nurse the child is an essential factor. Current opinion on this point is too optimistic. The brilliant results secured in children's homes are not decisive for such homes have a select clientèle. The time of observation in these homes is too short to settle the question whether an average mother can nurse her child for 9 months. Probably one third of the mothers cannot supply milk so long as that.

Blenck doubted the expediency of inquiring at a census into the manner of feeding infants. There would be a wide margin of error in the answers and to ask the questions would increase the popular dislike of statistical inquiries.

Kiaer said that in Norway the infant mortality among legitimate children had diminished but among illegitimate children had increased.

Schlossmann agreed with Dr. Bluhm and rejected von Bunge's method which relied on the midwife or physician attending at the birth. The question on the death certificate should be: How long was this child nursed?

Kriege said that, the results Dr. Seutemann and he had reached having been questioned, he would give further evidence that the data furnished by the midwives were trustworthy. They preferred the statements of midwives because

the mothers might be less willing to answer. So far as possible the midwife was sent to the mother whom she had attended. They carefully tested the answers of the midwives and convinced themselves that the answers were substantially correct. The information sought was, how the child was fed at the time the midwife visited the mother.

Tönnies defended Boeckh's results, but admitted that often they were wrongly interpreted as by inferring artificial food to be the cause of the high death rate among bottle-fed infants. A child nursed by its mother usually has better care otherwise. Mothers who did not nurse their children were often weak in other ways and their children might be feebler at birth than those of nursing mothers.

Meinert said that infant mortality was decreasing and its main cause, diarrheal diseases, apparently increasing. This was an error. Diarrheal diseases were more accurately diagnosed and fewer cases were returned erroneously as convulsions.

Weinberg said that the effort to reduce infant mortality should concern itself not only with the milk but also with controlling milk substitutes and limiting their supply to the prescription of a physician. The apparent decrease in the frequency with which mothers nursed their children in Berlin had been attended by a decrease of infant mortality. This paradox was not explained by the improvement in the quality of the milk, by the decrease of marital fecundity, or by the improvement of economic conditions. On the contrary they must assume that the more recent returns were more trustworthy than the earlier ones, because the people's suspicion of census questions had diminished. The returns of midwives were still more untrustworthy because a certain proportion of them were prejudiced against the nursing of children by mothers. No one but the physician can ascertain whether children are nursed and this can be done only by personal observation. Until this return is required by law of the entire population, official statistics must be limited to indirect geographical comparisons between the frequency with which children are nursed and the rate of infant mortality. In general the physician has medical reasons for recommending the mother to nurse her child and is not restricted to the

evidence which is furnished by statistics. The careful methods employed in the Berlin statistics of infant mortality and infant food are in striking contrast with the great inaccuracy of the data.

Poetter believed that midwives could hardly be dispensed with in getting statistics of nursing. This method for three years had clearly justified itself in Saxony. To be sure, the Saxon midwives stand higher than those of Prussia and heavier demands can be made upon them. Midwives may furnish the data for statistics of nursing if they are under satisfactory control and in a city this is quite possible.

Landsberger disagreed with Meinert's opinion that the influence of hot waves in summer was anything like equal to the influence of the mode of feeding. In Dresden attention is given only to the housing of infant children, but in Leipzig great attention is given to the kind of food.

Ascher thought there was no evidence that children who were not nursed were born of weaker mothers than other children. The assumption contradicted medical experience. The tenement house question was important because in supervising illegitimate children not only the food but also the housing conditions were improved.

Hahn believed the statistics compiled by Groth and himself were as sound as those of Kriege and Seutemann. They were derived from answers by mothers and nurses given at the time of the first vaccination. The material was gathered by physicians and they are more trustworthy than midwives. The favorable effects of breast-feeding appear in the statistics of Naples, showing a low infant mortality notwithstanding unsanitary conditions. This is due probably to the prevalence of breast-feeding.

Würzburger thought the low infant mortality of Naples was due probably to the frequency of abortion rather than to the prevalence of breast-feeding. The latter he thought no more common in Naples than in other Italian cities. His conjecture was supported by the very small number of illegitimate children born in Naples.

Silbergleit argued that the census returns indicating a decrease in the proportion of breast-fed children were correct.

This decrease he ascribed to the more frequent occupation of the wife and mother outside the home.

Landsberg pointed out that the defects in the Berlin returns were found mainly in the death certificates filled out by physicians. This was one reason why the example of Berlin had not been imitated elsewhere.

The *fourth* topic before the section, registration of vital statistics, including plural births, in Germany, brought out three papers by Würzburger, Prinzing, and Lommatzsch, but neither in the papers nor in the very brief discussion of them were any points made of much interest to persons attending the present Congress.

The *fifth* topic, family statistics, was discussed by March. This subject was first investigated by private students, Sadler, Duncan, and Ansell in England and Fahlbeck in Sweden. Only within the last thirty years has it been studied by official statisticians, using census and registration records. The census sometimes reports on a single family schedule all members of a family present or absent, and sometimes the number of children born to every married, widowed, or divorced person. The death certificate of each person who is or ever has been married should report the number of children born to the marriage; the birth certificate of every legitimate child should report the number of the birth in the family.

These records give different measures of the size of the family. The death certificate gives its final size at dissolution (except for the case of posthumous children); the census schedule or birth certificate, its size before the end. A marriage duration table like that of Boeckh shows that the average duration of a marriage before ending in death or divorce is $22\frac{1}{2}$ years and the median duration about 24 years. The average duration of the married life of couples enumerated by a census is France $20\frac{3}{4}$ years, Paris $15\frac{1}{4}$ years, Copenhagen $14\frac{3}{4}$ years, Berlin $12\frac{3}{4}$ years. In theory a marriage duration table should be computed for each combination of the ages of husband and wife.

The most important use of a table classifying the married couples reported in a census by age of husband and wife is to furnish a basis for computing the birth rate or natality as

affected by age of either party, as has been done in Norway, Budapest, and New South Wales. After excluding all marriages followed by a birth in less than 9 months, an age of maximum fecundity is indicated for the wife and the husband. Such returns also reveal the proportion of sterile marriages. Sterility is in some cases physiological; in others, volitional. Paarson studied the married couples in Copenhagen classified by the number of children born to them and concluded that the number of sterile marriages was about double what the theory would indicate, assuming a regular continuity of distribution. Sterility is more common the greater the age of the wife at marriage. Among couples who have been married at least 15 years in the rural communes of France sterile marriages are only 10 per cent. of the total; in Paris they are 17 per cent., and the proportion of sterile marriages rises with the size of the city. Sterile marriages are more common also in the well-to-do classes. Thus in Paris among couples who had been married just 15 years in a worker's district 19 per cent. were childless, while of similar families in a wealthy district 29 per cent. were childless.

The statistics of families permit a more thorough study than ordinary birth statistics of the circumstances controlling fecundity. Those statistics that we now have apply to small population groups or furnish results in insufficient detail. Still they supply useful indications which should be considered in all countries where the birth rate is falling.

Aside from their interest for establishing marriage duration tables and for insurance purposes, they show what age combinations of husband and wife are most favorable to fertility, indicate the mortality of mothers and of children, and bring to light other influences acting on the fertility or sterility of marriages, such as origin, occupation, or social position.

There is a widespread opinion that the decrease of the birth rate is due to the fact that families tend to determine the number of their children at a fixed and low number. Voluntary sterility is not thought to be a cause and people are disposed to admit that one type of family, those with two children only, is becoming more common. The statistics do not confirm this impression. Perhaps the number of

childless families is increasing and the variations in the size of the families not decreasing.

The problem of population is at the base of many others. It cannot be treated suitably without precise and detailed family statistics. It is desirable that in every country birth records, death records, and census returns should furnish information regarding the number, sex, and order of birth of children, whether living or dead, regarding the date of the marriage and the age of the parents in combination with other common returns, especially birthplace and occupation.

Under the same topic Weinberg urged that in addition to the usual registration records family registers like those of Württemberg be established. The brief discussion turned upon the wisdom of such a recommendation by the Congress and reached negative results.

Under the *sixth* topic, statistics of recruiting, Granjux and Simon presented a paper. Statistics of army recruits deal with facts of two classes. The first relates to the number of men who present themselves for examination, the second relates to those who are actually enlisted in the army.

It is the general practice to estimate the physical condition of the population of military age by the proportion of exemptions granted by the Military Board of Appeal, and the physical condition of the recruits by the proportion of later eliminations, that is, those made before the recruits depart for their post, before they arrive, or during their period of service, all these eliminations being entered as disabilities caused by the service. This is manifestly unfair, especially since large numbers of those passed by the Military Board of Appeal are really unfit and consequently are eliminated as soon as they arrive at their post.

All eliminations made by the army authorities during the first two months of service from the recruits passed by the Military Board should be classed with the eliminations made by that Board and not considered as due to the physical effects of army service. Two months are needed for the army surgeons to observe the condition of each man. A table for French recruits was given, showing the exemptions from

military service according to this plan and comparing them with figures reached according to the method now in use.

Another fact that makes statistical comparisons difficult is that orders have been issued from time to time lowering the physical requirements for military service. The physical condition of recruits is frequently taken as a measure of the physical condition of the population as a whole. It is evident that so far as the physical requirements are changed no comparisons can be made from period to period, at least not in diseases or defects affected by the change. Useful comparisons can be made only in diseases which have been recognized for all periods and in all countries as causing unquestionable disability for military service, such as tuberculosis, asthma, pulmonary emphysema, nervous troubles, etc. It is to be noticed that the prevalence of these diseases of the graver sort among army recruits may fairly be taken as a measure of the morbidity of the population as a whole or of certain sections, and may also be used for international comparisons. Minor physical defects, such as malformations or defects in sight or hearing, are not of such vital importance and are differently regarded in different countries and in the same country at different periods.

In the discussion of the statistics of recruiting, Griesbach said that there was no ground for claiming a general decrease in the capacity to bear arms on the part of the Germans and submitted a table for 10 European countries showing the per cent. of persons rejected at the military examination. Ballod said that they need have no fears regarding the present ability of Germans to bear arms, but in the future with the steady growth of the urban population there might be a marked decrease in this proportion. For example, of the persons examined in Berlin only 34 per cent. were able to bear arms, but in the eastern provinces from 65 to 70 per cent. Hesse expressed his regret that little attention was given in Germany to the statistics of recruits in other countries. Austria and Switzerland had much better statistics on this subject than Germany. Jacquart said that international comparisons in this field could be made only with the greatest caution. According to Griesbach's table Belgium and Switzerland had

a much higher proportion of persons physically unable to bear arms than the other countries of Europe. This was due, for Belgium at least, to the fact that they did not need many soldiers and in consequence the standards of the examining committee were severe. The bases for statistics in this field and the method of organizing the military service varied in the different countries so much as to prevent a comparison of the results obtained by different methods.

On topic *seven*, Dr. Feig considered the treatment of internal migration by the International Statistical Institute and the International Congresses on Hygiene and Demography and the statistical methods used by various states.

He mentioned three kinds of internal migration: (1) change of residence for considerable periods of time; (2) migration for a limited period for the purpose of securing work; (3) migration of travellers or visitors. Most of the discussion was limited to the first class. Statistics concerning them were gathered in three ways, two indirect and one direct. Until now the indirect methods have been most frequent. By one indirect method, the population increase as shown by the census is compared with the natural increase as shown by excess of births over deaths. The difference is the increase or decrease due to migration. The method has been used largely in Prussia where for each district a migration balance is made out. Of course this method does not give the number of arrivals or of departures but only the difference between them. Nor can it give other statistical data as to place, time, sex, and age. By the other indirect method census questions are asked about place of birth and date of leaving it. These together with questions concerning age, sex, and occupation give more detailed information as to the personal conditions of those who have migrated to the district where they were found.

The most satisfactory but least used method is that of direct observation. To make it possible, all persons coming into or going out of the district must be required by law to report to some official who asks all necessary questions. This compulsory registration can best be carried out in states where population registers have been maintained for some time, as Belgium, France, Holland, Italy, Finland, and Russia.

Registration of a change of residence is required in Prussia, Bavaria, Hesse, and other German states. In Switzerland permission for settling in a canton must be secured. A commune is given the privilege of requiring such registration in France, Austria, Spain, Norway, and Luxemburg.

Migration statistics can best be secured when there is compulsory registration for the whole state. But they may serve for many purposes when required only in communes, especially if the number of such communes be large. At best the figures represent a minimum. Emigration is more difficult to record than immigration. Feig closed with a detailed account of how the statistics are used in those states having compulsory registration.

In the discussion Goldstein said that the reason for internal migration, as well as for emigration, was found in the overpopulation of the country districts, where more persons were produced than the market demanded. If there was much agricultural land untilled, the rural population might increase, as land came under the plow. But if all the land was in use, population would increase only as extensive agriculture gave way to intensive agriculture demanding more labor. The rural population of Germany is stationary or decreasing. In 1871 it was 26.2 million; its maximum in 1880 was 26.5 million; since then it has steadily decreased and in 1900 was 25.7 million. The real reason for this decrease has been the introduction of agricultural machinery. The emigration from the country districts is greater than the decrease of the total population because births there exceed deaths.

Von Bortkiewicz said that the direct method of measuring internal migration (based upon registering all changes of residence) was statistically the ideal. To carry it out thoroughly seemed inconsistent with the theory of personal freedom and for many large areas this method was not in use. Statisticians will long have to use the indirect method, comparing the place of birth with the place of residence as reported by the census. The difficulty with this is that it leads to such extensive tables, even if few other elements are combined with it. This difficulty can be diminished by omitting a combination of each place of residence with each place of birth,

tabulating only whether the place of residence was the same as the place of birth or an adjacent town, county, or state, as the Austrian statistics have done so well.

Hesse said that an extension of the method of direct return was needed so as to show more thoroughly the place of origin of immigrants, especially dividing such places into urban and rural. In this way a better analysis of the question regarding the emigration from the country and immigration into the city would be possible; the amount of migration from one city to another shown; and important material furnished for the question of the longevity of the city-born population.

Under the *eighth* topic, emigration and immigration, Kiaer read a paper. Emigration is a relief to countries whose population is too dense and its general effect is to ameliorate the condition of the lower classes.

In gathering statistics of emigrants there are various places at which statistical observation may be made: (1) the place of origin; (2) the port of embarking; (3) the port of disembarking; (4) the destination of the immigrant; (5) the place where the immigrant is found by a census. The ideal method would be to gather statistics at all these points and compare the results.

In order to secure information at the place of origin the country must have a population register, and few countries have them. Of all the places of observation the best is the point at which an immigrant enters a country. By means of administrative measures the immigrant may be required to make a declaration.

The Berlin meeting of the International Statistical Institute (1903) recommended that birthplace should be stated at a census by giving the small administrative district of birth and that countries should exchange the information thus obtained. It is to be noted that in the United States where there are over ten million foreign-born it is difficult to secure information in such detail. The best place to secure this information would be at the port of embarkation.

Under the same topic Seibt read a paper upon the restriction of immigration as a means of protecting races, civilizations, or economic standards, summarizing the laws having

this purpose in view which had been adopted by countries receiving numerous immigrants.

In the discussion Neefe referred to Kiaer's proposal that every census should give the birthplace of immigrants and said it was as important or more important to give the last place of residence of those who have immigrated within the census period. Kiaer proposed questions about the cause of the emigration or immigration, and the length of stay, whether it was seasonal immigration, etc. Neefe thought it important also to inquire into the social and economic condition of the immigrants and the current of returning emigrants.

Ballod said that limitations upon immigration in order to protect the race and civilization of the receiving country are of much importance. After the abolition of slavery in Brazil in 1888 European immigration was encouraged by free transportation for the purpose of improving the stock which had deteriorated as a result of the infusion of Negro blood. In Morocco the Moorish population is much contaminated by Negro blood. As a result of recent progress in hygiene in connection with the struggle against malaria great subtropical areas which formerly had to be avoided by agricultural laborers because of this disease have been opened to the European races. Perhaps in future we shall have, in addition to the limitation of immigration in countries in which Europeans can live, the compulsory expatriation of colored people to the tropics.

Von Juraschek urged that migration was much influenced by rates for transportation, pointing out that the rate war in 1906 had greatly increased emigration from Austria-Hungary. It should further be noticed that the reduction in the time and cost of a journey often transforms migration from permanent to temporary, a fact which makes it all the more important to analyze the current of return migration. The number of foreign-born in the various countries of Europe has greatly increased of recent decades. In France alone there has been a marked decrease since 1896 and this as a result of certain regulations restricting the industrial opportunities of foreigners and facilitating their naturalization.

The papers on school hygiene and statistics (topic *nine*) by Gaspar and Oebbecke contain little of importance for the present Congress and led to no general discussion.

Under topic *ten*, occupational diseases and mortality, an extended paper was presented by Mayet, the main conclusions of which were as follows:

Morbidity statistics aim to determine how many cases of sickness and how many of each kind and each degree of severity occurred in a certain group of persons and thus how many are to be expected in future. It is not enough to know the number and kinds of cases; we must know also the number of persons in the group and relate one series of numbers to the other.

We must distinguish:

(a) Morbidity statistics showing neither the kind of occupation nor the kind of sickness.

(b) Morbidity statistics showing only the kind of occupation.

(c) Morbidity statistics showing only the kind of sickness.

(d) Morbidity statistics showing both the kind of occupation and the kind of sickness.

It is important to know of cases not producing disability as well as those that do. But in the following summary we are concerned only with the latter.

Morbidity tables should establish ratios between sicknesses and the number of persons among whom they occur.

Morbidity series tables show the occurrence of a definite number of sicknesses and measure the influence of legal provisions about the beginning and duration of relief upon the recorded days of sickness. They are therefore of importance for legislation and for insurance offices.

Morbidity-mortality tables show how many cases and days of sickness occur to each death. They permit us to infer from a known mortality the unknown morbidity of the group in which the mortality occurs.

The determination of morbidity calls for a classification of cases and members of the group by sex and age. In classifying occupations not the industry but the individual occupation is of primary importance.

To combine the two sexes in one number is erroneous. Tables without distinction of age are of little value.

It is important to distinguish the following age classes: under 15 and thereafter by 5 year age periods through 75, with a possible reduction to 6 ten-year age periods, 15-24, etc., and distinction of those under 15 and over 74. Where the groups are smaller we might make these classes: under 15, 15-34, 35-54, 55-74, 75 and over.

The occupational classification may differ from that used in occupational and industrial censuses, the former being determined by sanitary considerations, the latter mainly by economic and technical considerations. But unnecessary departures should be avoided. Occupations which one believes to be especially healthy or unhealthy should be treated separately.

The treatment of morbidity statistics is most likely to be satisfactory in the case of large sick insurance societies, trades unions, the army, and the navy. Important information may be obtained from prison officers, insane asylums, poor houses, and great steamship lines.

The enumeration of persons is most accurate provided the data show for each person: (a) the time of his paid membership; (b) the time during which he was insured, but paid nothing for it; (c) the days of sickness. These three periods together give the time exposed to risk. The sum of all the days of insurance of all insured persons divided by 365 gives the number of persons under observation for one year.

For each sex, age, and occupation the most important and trustworthy figure is the relation between the cases of sickness or of death, or the number of days of sickness, and the number of persons under observation for one year.

To compare the conditions in different occupations a large number of different tests may be used. Aside from tabulating the cases of sickness among persons not disabled thereby, the cases of sickness resulting in disability furnish the following tests: (a) ratio of the days of sickness to the days at risk; (b) ratio of the cases of sickness or (c) the days of sickness to the number of persons exposed; (d) average duration of the sickness; (e) curve of sickness according to age; (f) ratio be-

tween cases of payment, especially those involving the longest period of support, and the number of persons exposed; (g) ratio between the frequency of accidents, especially those involving long disability and the number of persons exposed; (h) ratio between the active members of an occupation and the insured members of the same occupation; (i) ratio of deaths to the number of persons; (k) ratio of deaths to the cases of sickness; (l) ratio of deaths to the number of days of sickness; (m) ratio between cases of abnormal childbirth and the number of persons; (n) ratio between the cases of abnormal childbirth attended with sickness and normal cases; (o) excess or deficiency of this occupation compared with the average in all or most of the age classes in all or most of these ways; (p) morbidity and mortality figures according to the kind of sickness.

We should strive to interpret current and new material according to these tests and in doing so a physician's diagnosis should be used. The physician should be asked to report whether the case is one of a trade sickness, an accident, tuberculosis, sexual disease, or alcoholism. In giving this report a form securing secrecy should be used. The relation of occupational morbidity statistics and mortality statistics to the length of the labor day, which the German Bundesrath may prescribe for trades endangering the health of the laborer by long hours, justifies an effort to determine by a card for each person incapacitated by sickness the relation between his sickness and his hours of labor.

No general tabulation of all morbidity data for all occupations and all kinds of sickness is to be desired but rather a selection each year of individual occupations or classes and a study of their morbidity. In such a case it is important to determinè the number of persons among whom the cases of sickness occur. As an aid to securing statistics of occupational morbidity, it is desirable also to inquire into the growing material touching cases of definite forms of sickness (trade diseases).

The following conclusions were reached in a paper by von Lindheim on occupational morbidity and mortality.

The statistical study of occupational morbidity and mortality would be aided if it were the law or custom for every one

who chooses an occupation to have his physical fitness for it ascertained by a physician.

Occupational morbidity and mortality statistics are a concern of the state and to aid private students of them is a duty of the state.

In spite of the difficulty of the problem, international conferences should be held to secure uniformity in the classification of diseases and causes of death and in the classification of occupations.

In using the material at hand, it is recommended

(a) Relative to occupational morbidity, that—

1. Existing statistics of sickness, accident and disability associations, public or private, should be tabulated and published by statistical offices in a more comprehensive way than previously.

2. All sick insurance funds and hospitals, public or private, should be required to report the occupation and age according to a uniform schedule.

(b) Relative to occupational mortality. In all cases of death an official *post-mortem* examination should be required and the physician should certify the cause of death.

The task of statistics relative to occupational morbidity and mortality is not merely to help life insurance and sickness insurance; it is also important as an aid in the choice of an occupation and may be of value in diagnosing or preventing disease. This kind of statistics must leave the beaten path. It must be modern and follow the new paths which medical science has opened. It must also allow for the new occupations which have developed through technical progress and changed social conditions.

In the meantime the Congress should declare it desirable:

(a) to maintain the sex classifications of all returns, even in the numerous professional occupations now entered by women; (b) to maintain a sharp distinction between factory occupations and hand trades; (c) to give a special treatment to persons engaged in transportation; (d) to ascertain the morbidity and mortality of office employees in telephone and telegraph industries; (e) to report separately the statistics of persons engaged in caring for the sick.

The discussion on these papers raised few points of interest to American statisticians.

Under topic *eleven*, the classification of statistics of the causes of disease and death, Guttstadt read a paper on the foundations of such statistics, Würzburger on the German classifications, and Bertillon on a comparison of the international and the German classifications. Bertillon pointed out that from the beginning of international gatherings at Brussels in 1853 statisticians insistently demanded uniformity in statistical work and especially uniformity in the classification of causes of death. American statisticians recognized the same need and took action in that direction more speedily than their European colleagues. The American Public Health Association decided in 1897 to adopt the classification of causes of death which had been submitted to the International Statistical Institute, on condition that it should be revised at an international gathering to be held in Paris in 1900. This endorsement of that classification was due in large part to the fact that it had been prepared in the effort to furnish titles comparable so far as possible with those of the English, the Berlin, and the Italian classifications. The requisite revision was made by an International Commission which gathered at the invitation of the French government and included delegates of 26 countries. This Commission not merely edited two classifications, a shorter one of 35 titles and a longer one of 179 titles; it also indicated the significance of each title by specifying the causes of death to be included under it, so as to make it perfectly definite. Furthermore it stated how deaths attributed to two causes, and this happens in about one third of the cases, should be classified.

This international classification has obtained a steadily increasing vogue. It is now employed by countries having about 200 million inhabitants and to the list might be added Italy, which has changed some of its titles in order to assimilate them to those of the international classification.

Furthermore we had much satisfaction in seeing this international classification adopted by German cities in a publication edited by the city of Cologne but later discontinued. Recently (1905) elaborate classifications have been published

by the German Imperial Health Office. Of those there are three: first, a very detailed list including 409 titles; second, an abbreviated list including 30 titles; third, a summary list including 14 titles.

As to the detailed nomenclature, it is doubtful whether a list of 409 titles can be used successfully in many countries. To print them is expensive and the list includes many which are seldom needed. Half of them would be left blank in the annual statistics of a city like Berlin, because not a single death from them would occur. This detailed list fortunately is almost entirely comparable with the international nomenclature, but the arrangement is completely different, so that any comparison between the two is most laborious. The abbreviated international list includes 35 titles and the German 30 but the two are very unlike. Hardly 9 are strictly comparable.

Under the *twelfth* topic, the relation between income and the death rate, Neeffe pointed out that the problem might be attacked directly or indirectly. By the direct method the population is divided into income groups and the death rate of each group determined. By the indirect method the population is divided according to residence in small districts and the probable position of each district in income or economic welfare and also its death rate determined. Neeffe preferred the direct method and suggested that wherever an income tax or a general property tax was in force a statement of the amount of the tax paid might be required on the death certificate of each taxpayer and, in default of this, in cities where housing statistics are gathered, a similar return regarding housing might be required on each certificate.

A paper of Singer touched little on the statistical aspects of the subject.

As the direct method favored by Neeffe can hardly be applied to any American population, the paper by Bertillon, continuing his previous studies in which he employed the indirect method, bears a closer relation to our conditions. He said statisticians have often sought to distinguish social classes. The phrase, a social class, is vague and hard to define. Although money income constitutes the main difference be-

tween social classes, yet it is not the only difference. From this indefiniteness of the problem comes the difficulty in solving it.*

My solution is open to many objections, the weight of which I recognize. It has at least the merit of not being arbitrary. I have tried to indicate in figures the average prosperity of each district of Paris (Paris is divided into 20 districts, each of which contains between 60,000 and 250,000 inhabitants).

I do not rely upon a single measure of social condition but upon several and these give practically identical results.

(1) In 1,000 breadwinners how many are employers, employees, laborers?

(2) In 1,000 households of at least two persons, how many maid servants?

(3) In 1,000 households of at least two persons, how many men servants?

These latter two points combined with the first allow us to determine important economic distinctions.

We can estimate approximately:

(a) The number of working families.

(b) The number of families of employees or employers without a domestic.

(c) The number of families of employees or employers with a maid servant.

(d) Among the last how many have also a man servant.

This calculation divides the population of each district into four classes.

The statistics of lodgings give information of no less importance about the wealth of the population, showing how many families have more rooms than one per member, how many families have fewer rooms than members, and finally how many live in overcrowded apartments, or those with more than two members to a room. This calculation permits one to distinguish the different social classes living in each part of the city.

I have also made the following estimate: In 1,000 marriages how many are made with a marriage contract? This

*The problem has been attacked by many authors, notably: Westergaard and Rubin of Copenhagen, Fahlbeck of Sweden, Verrijn Stuart of Holland. We recall also the much earlier work of Villermé of Paris.

is a document witnessed before a notary, setting forth the property of groom and bride and the rules to which it shall be subject. If there is no contract, the fortune is subject to provisions of law which do not correspond to present needs. It is clear that the marriage contract is of no use unless the parties possess property. The frequency with which it is used in different parts of the same city indicates the proportion of families that have some means.

These ways of estimating wealth give results in close agreement. In Paris the first ten districts (the central ones) are inhabited by a large number of well-to-do persons and a smaller number of persons of scanty means, while the other ten districts (except the rich one of Passy and a part of Batignolles) are inhabited chiefly by a population of scanty means.

I have made an analogous classification for Berlin and Vienna (for London the classification by Booth is much more difficult).

For the Tenth International Congress of Hygiene and Demography (Paris 1900) I studied the frequency of the principal causes of death in Paris, Berlin, and Vienna according to the degree of wealth of the various districts. The remarkable agreement of the results warrants the belief that they express constant and general relations.

One serious objection can be raised. The statistics were not classified by cause of death, by district, and by age. The last point is important. In the three cities (and without doubt in the majority of others) the birth rate in the poor districts is about three times as high as in the rich districts. Therefore there are many children in the poor districts, so that those districts should have much measles, infantile diarrhea, etc., even if the probability of a child's contracting one of these diseases was not greater in them than elsewhere. That objection is not as weighty as at first appears, for a classification by age, in general, does not modify greatly the order of the various districts of the same city.

Nevertheless, the statistics of Paris, since 1893, to escape that criticism, have given the number of deaths by principal causes and by age groups for each district. The result of that experience I have the honor to summarize to the Congress.

The complete tables appear in the *Annuaire Statistique de la Ville de Paris* for 1905.

Comparisons of the figures for Paris with those for Berlin and Vienna were given at the Congress on Hygiene and Demography at Paris 1900 and I shall not repeat them here. Lack of space does not permit me to reproduce the figures for the 20 districts of Paris. I shall limit myself to citing those for 6 typical districts. For each of these I will give the figures of two periods in order that the degree of constancy may be judged.

At each age the death rate varies inversely as the wealth. The mortality of the later period is in almost all cases below that in the earlier period. Parisian mortality has very greatly diminished in the last 20 years.

There is no relation between the degree of wealth and the frequency of typhoid fever. Measles occurs almost exactly in inverse ratio to the degree of wealth. Scarlet fever spares the quarters of the rich or very rich but not always those of the comfortably off. It is more frequent in the poor quarters. Whooping cough occurs almost exactly in inverse ratio to the degree of wealth. Diphtheria is much more frequent in the poor quarters than in others. The richer the district, the less frequent is tuberculosis; the poorer the district, the more frequent it is. Probably all the consequences of poverty contribute to that result; it would be hard to distinguish the part played by insufficiency of lodgings, insufficiency of food, alcoholic excesses, etc. We confine ourselves to the statement that poverty and tuberculosis are found together. The frequency of simple or tuberculous meningitis, indistinguishable diseases, is in inverse ratio to the degree of wealth of each district. In the case of cancer, the differences which separate the various districts are slight and do not run parallel with the degree of wealth. Congestion and cerebral hemorrhage affect rich districts less than poor. In regard to organic diseases of the heart, the differences which separate the districts are not great. The poor are a little more hit than the rich. Infantile diarrhea is far more frequent among the poor than among the rich. Congenital debility reaches its maximum in the rich district of the Opera; its minimum in the poor districts. This

without doubt is connected with the higher stillbirth rate in the rich districts (Verrijn Stuart has observed the same fact among the wealthy families of Holland). It is remarkable that the unfortunate women of the common people, compelled to work until the time of their confinement, give their children more strength than the daughters of the well-to-do whose existence is easier but whose education has not properly developed their muscular system. Senile debility does not vary in proportion to the degree of poverty of the districts. It is somewhat rare in the wretched Menilmontant district and somewhat frequent in the district of Luxemburg, which is, however, very comfortably off. It is true that other poor quarters and other rich quarters present very different figures.

Conclusions. Most of the principal causes of death burden the poor districts more than the rich. This is notably so of the fevers of childhood (measles, scarlet fever, whooping cough, and diphtheria), of infantile diarrhea, pulmonary tuberculosis, meningitis, congestion and cerebral hemorrhage, respiratory diseases, cirrhosis of the liver, and deaths by violence. Other causes of death, such as typhoid fever, cancer, congenital debility, and senile debility, appear not to be influenced by the degree of wealth.

A paper was presented by Dr. Hamburger on the connection between infant mortality and the number of conceptions in 1042 laborers' families in which there had been 7,261 conceptions. His main conclusions were:

1. Every conception which does not ultimately result in increasing the number of breadwinners, or persons over 16 years of age, results in an economic loss.
2. For rational statistics of population it is necessary to consider what proportion of the children conceived reach the age at which they can begin to return what they have cost.
3. The answer to this question has not been possible because the requisite returns regarding miscarriages have not been available.
4. Every premature death, every stillbirth or miscarriage seriously burdens a family, reducing the physical energy of the mother and her earning power and involving unproductive expenditures for a midwife, nursing, a burial, etc.

5. The average number of conceptions per marriage is 7 among workers and 3.5 among the rich.

6. Among children conceived in working-class families more than half die before they reach the age of 16, one third by death, one sixth by miscarriage.

7. The productivity of such marriages as measured by the proportion of all conceived who reach 16 years of age sinks regularly as the number of conceptions per marriage increases.

8. In order to maintain the population of the German Empire constant there must be 3 conceptions per marriage.

9. Under such a system the population would slowly increase: (a) because the illegitimate children, from 8 to 9 per cent. of all births, have not been counted; (b) because the rich have not been considered and their marriages show a higher proportion of survivors; (c) because the following out of such a system would increase the population of survivors by making better care for each child possible.

10. A number of conceptions such that more than one half of them fail to reach the age of 16 is harmful.

11. In struggling against infant mortality under present conditions the most effective means is a reduction in the number of conceptions. Subordinate means like the recommendation of maternal nursing, however important, must be neglected in comparison, for the regular increase in the proportion of losses, as the number of conceptions per family rises, proves that to rear their children in such cases surpasses the parents' powers.

12. The dogma of the blessedness of a very large number of children must disappear, provided that with more extensive data and more careful analysis my conclusion is corroborated that as the number of conceptions increases the proportion failing to reach the sixteenth year increases even more rapidly.

13. The state as well as the family has an interest in a marked limitation upon the number of conceptions, for the energy of the nation should not be wasted upon miscarriages, stillbirths, and living births of children who fail to reach the sixteenth year of age, and these at the present time are more than one half of all conceptions.

14. There is no danger for the state in the decrease of births, for it has been more than compensated by the decrease of deaths.

In the discussion Würzburger mentioned that the general conclusion that mortality decreases with the increase of income does not apply, at least in Dresden, to mortality in the first months of life. On the contrary, no difference between children of poor and of rich families can be traced until the fourth month after birth.

Von Bortkiewicz said that as a rule marital fecundity and mortality, especially infant mortality, decrease with increase of income. The question is whether there is any direct connection between a larger number of children and a higher infant mortality. From the point of view of method these investigations of Hamburger raise various questions. There is a chance for error in the fact that not all children were observed up to the sixteenth year. Furthermore the slight mortality among the children of women who have had only one child is largely due to the following circumstance. Dr. Hamburger got a beginning for his observations when he examined the eyes of the children. But mothers who had had only one child and had lost it by death seldom brought that child to Dr. Hamburger and this fact must contribute to make the returns for that class unrepresentative. The results reached by Verrijn Stuart and laid before the Budapest meeting of the International Statistical Institute should be compared. He examined the connection between the number of children and infant mortality in much more accurate fashion, avoiding the one-sidedness involved in Dr. Hamburger's method. Verrijn Stuart claimed that in large families the very number of children born might increase infant mortality because no satisfactory care and attention could be given to each child and, on the other hand, the death of one or more children might increase the parents' desire for more children. In general the connection between the number of children and infant mortality was treated by him more clearly than by Dr. Hamburger.

Weinberg said that all statistical material of this sort gathered by physicians involves a biased selection, so it is desir-

able to have an investigation of an entire population. Such an investigation in the middle of the 80's was made by Geissler of Saxony and showed a relation between the number of children and infant mortality and also a relation between infant mortality and the interval between births.

Under topic *thirteen*, statistics of housing, Böhmert presented a paper on the task and methods of such statistics.

The initial question, whether the present housing statistics of Germany furnish comparable data, he was compelled to answer in the negative. Proceeding to consider the reasons for the great untrustworthiness of the statistics in this field, he found them in the lack of definite and unvarying units of measurement. For the central element regarding the hygienic and social value of a dwelling they had and could have no measure. The value of a dwelling is the result of many different factors and to reduce them to a simple and clear scale and test, such as every statistical measurement requires, is impossible. That value depends upon the number, kind, and size of the rooms, the number of occupants, the way in which the several rooms are used, the intensity of that use, that is, whether they are used only by night or also by day, whether they are used only for residence or also for labor, and the rent of the rooms. In addition to these fundamental questions there are others of great hygienic and social importance, such as the number and kind of sleeping rooms in relation to the number of occupants. Regarding air, it is not enough to measure the cubic air space per capita. Much depends upon the possibility of ventilation and the practice of ventilation and also upon the quality of the air admitted. Inquiry should be made into the supply of light, sanitary arrangements and water connections, how the family is made up, whether it includes lodgers as well as members of the family, children as well as adults. If there are children it is important to know whether they have a chance to play out of doors. The income and occupation of the residents are also important. One who spends his working time out of doors is less dependent upon his home. It is perhaps healthier for such a person to spend more of his income on clothing and food. In this case, as in so many others, one hygienic advantage may be bought

by a hygienic sacrifice in another direction and this is a fundamental principle in the housing question. Böhmert sums up that the statistics of city housing find their main problem not in massing huge comparable figures but in special investigations for practical, local purposes.

Pohle presented a paper on the results of housing statistics in Germany, pointing out that, aside from a few inquiries by certain states of the Empire, like Württemberg and Saxony, such statistics have been gathered only in cities of more than 100,000 inhabitants. Now that statistical offices have been gradually established in the large German cities, they have rightly regarded it as one of their main problems to gather periodic returns regarding housing conditions and to publish the results. For this reason a report on the housing conditions in Germany must be limited to the housing statistics of large cities.

The discussion upon this topic and the two papers without subsequent discussion upon topic *fourteen*, a comparison between life tables for entire populations and insurance life tables, brought out little of interest to American statisticians.

The *fifteenth* topic, statistics of accidents and of their results, was discussed by Klein who reached the following conclusions:

(1) According to German experience the frequency of accidents is best measured by the number injured to whom a first payment is made during the year, compared with the number of full laborers; that is, one three hundredth of the total number of days of labor during the year on the part of all insured persons.

(2) The older German accident statistics give this figure since 1897 for insured persons and groups.

(3) The German statistics of trade accidents for 1907 and subsequent years will determine the frequency of accidents more exactly and thoroughly by a further analysis both of the new accidents and also of the number of full laborers in the various industries. The most important improvements are:

(a) A classification of the insured industries and of the accidents by occupations and industries and district where the accident occurred.

(b) A further analysis of full laborers and of persons suffering from accidents by sex and age.

(4) The German statistics of results of accidents show their effect upon the earning power of the injured and their duration classifying them as follows: death; permanent disability, complete or partial; and temporary disability. The degree of disability is measured as less than 25, 25-50, 50-75, and more than 75 per cent. disabled.

(5) The determination of the kind of disability as well as of its degree is made for four successive years after the accident.

(6) The returns obtained from trade societies permit also a presentation of the results of the accident according to the actual condition of the person one, two, three, four, and five years after the accident occurred and so permit a survey of the duration of relief.

Schnitzler's main results were as follows:

(1) The frequency of accidents has increased, the increase appearing mainly in cases entailing a brief disability. This arouses the suspicion that the increase is due to the gradual extension of a knowledge of the law and to the more general presentation of claims for relief.

(2) Both the frequency and the severity of accidents depend upon the occupation. A trustworthy determination of occupational accident rates is impossible with the present organization of accident insurance and can hardly be carried out in future on account of the different occupations in one industry. For this reason emphasis must be laid upon a sharp distinction between the kinds of industries.

(3) The frequency of accidents increases with age and that of serious accidents increases faster than that of slight accidents.

(4) Statistics show less frequency of accidents among women, but when accidents do occur they are somewhat more severe than for men. This may be due to the fact that the women as a class work at the less dangerous occupations.

Topic *sixteen*, the decrease of fecundity, was discussed by von Juraschek who reached the following general conclusions. In almost all countries the general death rate has fallen much faster than the birth rate. This decrease in Europe during the last three decades of the nineteenth century was between

3 and 4 per thousand. This decrease can not be due to the diminished birth rate alone, since it is greater in amount, as appears from the increased excess of living births over deaths toward the end of the century. The decrease of the death rate and increase in the excess of births over deaths have affected the birth rate partly by reducing the number of marriages, partly by decreasing the desire for large families.

Von Mayr discussed the same subject, saying that birth rate figures must be studied in their distribution in time, in space, and by social classes and with a distinction between legitimate and illegitimate birth rates. The rates should be computed for women of child-bearing age. These women should be classified by age in periods not greater than 5 years. In studies of the legitimate birth rate the age of the husband as well as that of the wife should be considered.

In studying the distribution in space, it is important to distinguish small districts and to classify as between city and country or by groups according to density of population.

The study should be made with great geographical detail and the figures analyzed by social or economic classes, or, where this is possible, by nationalities or races, if possible also by religion, occupation, and economic position.

For classification according to occupation, a preliminary work is needed; viz., a determination of characteristic occupational groups to be distinguished not only in occupation tables but also in other census returns and in registration records. The determination of the suitable occupational groups should be made by the International Statistical Institute.

With reference to economic position there should be a combination between income tax data and birth rate figures. At the present time individual investigations in this direction should be attempted. In conclusion he mentioned the main points at which the returns now available need to be supplemented and also the extensions of tabulation that were needed.

Kuczynski followed von Mayr. The crude birth rate is the ratio between the number of births and the population. It varies with the proportion of women of child-bearing age

in the population. Because of this, a corrected or refined birth rate has been found by comparing the number of births with the number of women 15-49 years of age. This figure, however, is not a perfect measure of fertility. The larger the proportion of women at the middle period of child-bearing age, say 25-45, in the total 15-49, the larger the number of births.

To allow for the difference in age distribution von Mayr at the Brussels meeting of the International Congress on Hygiene and Demography proposed to adjust the birth rate for the several years of child-bearing age to a standard age composition derived from a life table, his object being to allow for differences in the influence of migrations and in mortality. This method, however, presupposes the existence of a satisfactory life table. To select a life table for some third population group is likely to be misleading. In such cases it might be well to exclude the influence of mortality entirely and compute how many births to each thousand girls arriving at the age of child-bearing would occur in each region to be studied, if the number of women of child-bearing age at each year of age between 15 and 49 was the same.

A further correction is needed to allow for differences in marital condition. This results in two birth rates, a legitimate birth rate per 1,000 married women of child-bearing age and an illegitimate birth rate per 1,000 unmarried women of child-bearing age. The differences in the legitimate birth rates of different countries are far less than the differences in the birth rate per 1,000 total women of child-bearing age. On the other hand, the differences in the illegitimate birth rates of different countries are very great. It is desirable to make still another correction by allowing for the numerous class of children conceived before marriage but born after marriage. Wherever in reporting a legitimate birth the date of the marriage between the parents is reported and tabulated (and this has been done in Austria, Berlin, Dresden, Amsterdam, New South Wales, and West Australia) a correction for such cases can be made. Among 100 first-born legitimate children those born within less than 9 months after the mar-

riage were in Dresden 43, Berlin 39, Amsterdam 34, New South Wales 27, and West Australia 20.

These legitimate and illegitimate birth rates again, like the ordinary corrected birth rate, are influenced by the proportion that the women between 20 or 25 and 40 make of the total 15-49 years of age.

The discussion of this topic was very brief and added nothing of general interest.

Resolutions adopted at the recommendation of the Section on Demography by the last two International Congresses on Hygiene and Demography.

XII. INTERNATIONAL CONGRESS (BRUSSELS 1903)

1. As infant mortality is of great importance for the welfare and social condition of nations and as statistics unaided cannot improve the bases for the statistics of stillbirths, this Congress desires that all governments should revise their administrative ordinances for registering births so that all births (including premature births and stillbirths) should be registered with the facts about them. Statisticians in conjunction with physicians should then in tabulating births introduce a uniform treatment of premature births and stillbirths.

2. There should be effective and general enforcement of the law requiring that the death certificate should be verified by a physician appointed by the local authority and in countries where no such provision exists it should be established.

3. Doctors should be required by law to report the causes of deaths which have occurred in their practice.

4. Until such a law is enacted there may be an unsigned declaration of the cause of death following in its main lines the Swiss system.

5. The statistical analysis of demographic returns is made by breaking them up into homogeneous groups. In order to discover these groups many details must be reported.

In editing such records and preparing for their statistical tabulation it is important to increase the number of the returns that facilitate the formation of homogeneous groups. Such records can furnish the elements of two important

ratios: first, the total fecundity of marriages measured when they are dissolved; secondly, the annual fecundity determined by the annual number of births.

6. The Congress, recognizing that heredity and alcoholism are among the principal causes of insanity, believes that active efforts should be made to spread the knowledge that marriages with inebriates or with neurotics often result in the birth of mentally defective children.

7. The Congress desires that the public authorities should perfect the organization of psychiatry and of asylums by establishing a special body of doctors expert in mental diseases whose certificates may provide the protection due to individual liberty and take the place in large degree of legal and administrative formalities.

8. The Congress desires that in every country there may be published periodical statistics of the insane whether in asylums or out. It believes that such statistics ought to be prepared even if they include only such insane as are reported to the public authorities.

9. The only means for the government to acquire precise knowledge of the danger of alcohol and the necessity for energetic measures against it is to organize a great statistical referendum by which the losses due to alcohol should be carefully analyzed. The Section on Demography urges that the form suitable for such statistics should be examined at the next session.

10. The Congress desires that the eleventh question,—internal migration; depopulation of the rural districts; growth of cities, advantages and disadvantages; causes and remedies,—should be completed as follows: (1) Definition of an urban center (the statistical unit as distinguished from the administrative unit); (2) Definitions of rural agglomeration and of industrial agglomeration.

11. The Congress believes that the practical value of demographic data would be increased if they could be separately established for the poor. The most perfect means of getting statistics of the poor would be by determining *a posteriori* the number of the poor through a census of the income of every family. This method being in many cases difficult to follow,

the method of classification *a priori* should be employed by considering as poor all those who ask relief from the public funds or from charity. Although the terms poor and pauper are not entirely synonymous, the Congress is of the opinion that the statistics of individuals aided by charitable institutions might give very serviceable returns to demography.

12. The Congress desires that an international bibliography of hygiene and demography should be established.

XIV. INTERNATIONAL CONGRESS (BERLIN 1907)

I. 1. In view of the results heretofore secured, the Congress believes that statistical officers should compute life tables for the populations classified as urban and rural and by occupation, social position, and, of possible, income, and urges the statistical officials who are present to work in that direction.

2. For computing exact life tables it is very much to be desired that the deaths should be classified both by decedent's year of birth and by decedent's year of age as the International Statistical Congress at The Hague in 1869 recommended.

II. The Congress desires that on the death certificates the occupation and position in the occupation should be given as specifically as possible.

III. The Congress recommends that international conferences convene periodically to promote uniformity in returning the causes of death.

IV. 1. To tabulate morbidity statistics obtained through sick insurance funds is a duty of the state; to forward private studies in this field is advantageous to it.

2. The Congress believes that states which publish morbidity statistics in connection with sick insurance funds should hold conferences to examine the details of such statistics.

V. The Congress regards the improvement of tenements as one of the most important questions affecting the public welfare. Along with efforts at improved regulations legal provisions for the oversight of tenements by the municipality are needed.

VI. 1. In order to learn exactly what regulations are needed to secure the proper hygiene of tenements and to obviate the

danger of disease due to unhealthy conditions, regular statistics of all city buildings should be prepared.

2. The influence of housing conditions on the prevalence and spread of tuberculosis in every large city should be investigated.

VIII. The Congress believes that it is practicable and important to develop the statistics of accidents in the various countries so as to make them comparable. It cordially welcomes the efforts made in this direction by the International Statistical Institute and the International Congresses on Workingmen's Insurance.

It especially desires that states which have similar systems of compulsory insurance against accident should agree upon similar methods of gathering and tabulating the statistics.